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THREATS TO THE PARKS - FACT OR FICTION?
Harry W. Pfanz

A science fiction film entitled "Soylent Green" once predicted that overpopulation would destroy the earth's green spots, that there would be no more Smokies, Grand Tetons, or Everglades. Fact or fiction? One wonders after reading the National Park Service's 1980 State of the Parks report. The report synthesizes an earlier survey of 4,354 threats reported by park personnel or disclosed through scientific parks studies data. It itemizes such problems as increased boating on Glacier say (which may threaten the habitat of endangered humpback whales) the development of geothermal resources along Bandelier's western border, the intrusion of European boars in the Great Smokey Mountains, the overabundance of visitors at Petersburg, Shiloh, and other cultural parks...The list goes on. The report is a catalog of ailments which, for better or worse, have changed and will continue to change the face of numerous NPS holdings.

Yet despite the headlines, most of us in the Service know that the threats cited are not news. They represent conditions long a challenge to park managers and personnel. Their very presence underlines the changing complexity of the park community. They resurface the old dilemma: can a cultural or natural resource be protected from the impact of time, and should it be so protected? This question, indeed, is a significant one, and should be considered when State of the Parks statistics are cited. Since numerous threats to the parks have not been fully documented, and since the ramifications of those that have been documented are not fully known, we must continue to treat each of them seriously, but without undue alarm for the durability of the resource.

Initiated as a request from the House Interior Parks Subcommittee, the initial research on the Threats to the Parks issue was handled by the NPS office of Science and Technology. That office formulated a questionnaire, touching primarily on natural threats, which was distributed to park managers. Seven major threat categories were isolated: aesthetic degradation, air pollution, physical removal of resources, exotic encroachment, visitor physical impacts, water quality pollution and water quantity changes, and park operations. The primary results of the survey included such striking finds as the following: 1) 75% of all reported threats were classified as inadequately documented by either private or government research; 2) better than 50% of all reported threats were attributed to sources or activities located external to the parks; 3) internal threats to the parks were most often associated with heavy visitor use, park utility access corridors, vehicle noise, soil erosion, and exotic plant and animal intrusions; and 4) 60% of all parks reported appreciable threats to their scenic resources.

One oversight of the survey was the absence of a well-defined category for threats to cultural resource-related parks. To remedy this, a second questionnaire will shortly be distributed to park managers. It will cover historical, architectural, and archeological/anthropological resources and, like the previous questionnaire, will document the occurrence of external as well as internal threats. It will also request information on changing urban patterns, political pressures, ground and atmospheric threats, private exploitation, and employee commitment to the protection of cultural resources. In conjunction with the first survey, the results of this second survey should provide a more fully rounded picture of exactly what park managers are up against.

The State of the Parks report also underlined an important deficiency in most park management plans -- the absence of quantifiable research. A startling 75% of the threats reported were unverified by documentation. The real bottom line about the report is that it is a place to start understanding. "It gives us a basis for really doing it right for a change," says Dave Dame, Chief, Interpretation, WASO.

As "a place to start understanding" the report is of unquestionable value to the National Park Service. It justifies an increased research program. It encourages the growth of a sympathetic hearing within the park community for the role of research. It provides a rationale for confronting current false concepts of park management. According to the 1980 report, a large percentage of park problems arise out of employee ignorance. Findings indicate park employees simply do not understand precisely what they are protecting. Recognition that employees are not always well informed is the first step. The second is to remedy the situation -- both through training programs and through increased sensitivity to the preservation needs of the cultural and natural park community.

The report itself makes some basic observations and comes to some necessary conclusions. It terms an inventory of NPS resources essential to the management of those same resources, and states that we must accumulate baseline data about them. It states that we must pay greater heed to the external threats than we have in the past, and prepare ourselves to quantify and document all threats. It concludes that we must increase our resource management capability if we are to fulfill the Service's mandate. These conclusions are apt, though not surprising.

Cultural resource managers have already taken some steps. We have developed the List of Classified Structures, as well as a bibliography of Service Studies. A Cultural Sites Inventory and a computerized National Catalog of Museum Artifacts is being developed. Nevertheless, there is still much to do before we have our house in order.

While the Service cannot deal unilaterally with many of the threats, particularly those of external origin, it can counter most of those that arise within parks and areas adjacent to park boundaries. Cooperation with local governments can sometimes obtain needed zoning and boundary protection, and buffer zones can be developed through fee land acquisition programs. Ignorance of effective management policies can be ameliorated to some extent through proper training in NPS management policies and guidelines.

The 1980 Report to Congress represents a system-wide appraisal of NPS resources. By its nature, the report implies a price for our enjoyment of the parks. Visitors must understand they pay a price which is far greater than the occasional entrance fee to certain parks. They pay in the decline of certain forms of vegetation, in the destruction of certain scenic views, in overcrowded conditions. Time does not stand still, neither within a park nor outside its boundaries.

For the parks, the future is not necessarily bright, but then neither is it bleak. The direction it takes merely requires hard work. And to succeed, it has to be directed by fact, rather than fortified by emotion. The State of the Parks Report has made us more aware. Now we must decide how best to use our new awareness. ~

HISTORICAL UTILITY LINES: A RESOURCE IN SEARCH OF CONSTITUENTS

Jackson W. Moore, Jr.

"In historic zones, utilities that were present during the historic period are historic resources and shall be governed by the same policies as for other historic resource 8. "

--Proposed Guidelines for Private Utility Line Rights-of-Way Use

Permits and Contracts, Denver Service Center, 1980.

With the decision to include utility lines as part of the historic scene, we concomitantly expand the scope of those parts of historic preservation and the "built environment" that are to be managed as cultural resources. Water mains or wooden tubes, and wrought and cast iron take their places beside boxwood groves and bois d'arc shelterbelts as historic appendages to historic ranches, battlefields, and presidential homes/birthplaces .

The difference, for the time being, is that trees, grasses, cacti, etc. have active constituents outside of the historic preservation field. Once the decision is made to preserve natural resources of the historic scene, they are closely monitored by naturalists, landscape architects, and historic architects for starters.

There is no question but that utility lines are designed by professionals in accordance with the styles of the times and laid/installed by "craftsmen." They are artifacts which reflect both their culture and the historical state of the art of their technology. They also have fabric that can be judged in terms of its condition and integrity.

The logical constituency of utility lines would include engineers, draftsmen and tradesmen, all of whom would represent various subfields and specialties. Should they, in fact, develop into such a constituency, the engineer would become analogous to the designer/builder, and the technician to the craftsman.

Most historical archeologists have observed (while preparing to destroy) substantial quantities of utility lines of every time period and local style. I experienced a fleeting awareness of this while engaged in archeological explorations at Franklin Court, at Independence NHP, during 1961. Bruce Powell and I encountered a very complex array of utilities beneath Orianna Street's Belgian block paving: wood, steel, wrought and cast iron, lead, and ceramic conduits for water, gas, electricity, both abandoned and "live. "

After we accidentally cut off our own water, the City of Philadelphia appointed a supervisory technician to monitor and consult with us. Somewhat bellicose, what he lacked in couth he made up for with an extensive knowledge of utilities. Initially totally indifferent toward the "dead" and obsolete utility lines, he gradually succumbed to curiosity as we dug deeper. When we cleaned off a straight wall profile some 10 feet high, presenting a mosaic of cross-sectioned utilities of various periods, he was hooked. He did some research and invited specialist technicians from City Hall. One of these fairly swooned when we uncovered a primitive gutter drop-inlet at a lower level, and narrower, curb of Orianna street. I have long forgotten the slang term by which he identified drop-inlets of the late 19th century, but we were as delighted with the date (which I have also forgotten) as he was to see one.

For the nonce a small constituency for utilities existed. We duly recorded the various utilities with scale drawings, photographs, and narratives, and left them to be destroyed by the course of subsequent events.

There are comparable utilitarian historic resources (if we have really decided that this is what they are) in urban parks throughout the system, as well as in non-Service historic districts across the land. Some of the first brick-vault sewers still exist which replaced the garderober's limitations and permitted the skyscraper and the concentrations of population that they made possible.

Some utility lines have always found champions (despite being utilitarian) but usually

as adjuncts. Adjuncts, after all, are what utilities--all kinds--are. But 90 is the derrick, the rail, and the bridge, and by extension, the tanker. Utility lines, illustrative of technology, will be viable historical resources only if, and for as long as, they have a caring constituency. But who cares?

THE PALEO INDIAN PERIOD IN NORTH AMERICA: NEW EVIDENCE FROM EASTERN NORTH AMERICA

Richard J. Dent

The Accockeek Foundation

Those whose file of National Geographic magazines reaches back to December 1955, have seen what they [Paleo Indians] are thought to have looked likeOne double paged spread, in color, shows a statuesquely arranged, three-generation grouping of them, babe in-arms to dotard, huddled together calf-deep in snow, clad in loose wraps of hide, and facing a rising blizzard against a background of blasted heath and imperturbable woolly mammoths.

Description in The American Dawn by Louis Brennan

There has always been something intrinsically romantic about speculating on the lifeways of the first humans to enter the New World. Unfortunately, the romantic speculation such as that which the eminent archeologist, Louis Brennan, described for us above, sometimes finding itself metamorphosed into scientific fact. The unearthing of a fluted point, diagnostic of the Paleo Indian period in North American archeology, immediately stirs thoughts of a band of ice age hunters stalking one species or another of ubiquitous Pleistocene megafauna. In this short essay, however, we are going to return to the sobriety of hard evidence. We are going to examine how four painstaking years of excavation and countless hours of laboratory analyses at the Shawnee Minisink site in northeastern Pennsylvania have added a significant new dimension to our understanding of the initial inhabitants of the Americas. But first, a little background information is necessary.

For many years during archeology's infancy a few scientists daringly argued that descendants of present-day Native Americans had been in the New World since the termination of the ice age some 10,000 to 15,000 years ago. This postulated tenure was mostly based on similarities perceived between European Paleolithic implements and putative artifacts of similar age in North America as well as the supposed association between items of human manufacture and late Pleistocene geologic strata. No matter what the case, however, definite evidence for this great time depth could not be unequivocally demonstrated. The impasse was not breached until 1926 when J . D . Figgins discovered chipped stone projectile points literally embedded in bison bones at Folsom, New Mexico. Since we knew that this particular species of bison had gone extinct near the end of the Pleistocene, our acceptance of populations in the New World during the same period was now warranted.

Today we know much more about these first people to enter the New World. They had crossed a land bridge which became exposed between Siberia and Alaska when world-wide sea levels dropped in response to continental glaciers trapping significant amounts of the world's total water supply in their frozen masses. This causeway, known as the Bering Land Bridge, was traversable at least twice, the last period being around 12,000 years ago. After moving, probably unconsciously, into the Americas across this bridge, Paleo Indian groups then migrated down through an ice-free corridor, between the Laurentide ice pack to the northeast and the Cordilleran to the northwest, into more temperate areas of the North American continent and eventually into the southern latitudes of Central and South America. They carried with them a distinctive technology for extracting their subsistence from the environment. In this Paleo Indian tool kit a unique projectile point with large channel flakes removed from its basal portion leaving distinctive flutes is almost always present. It is these fluted points (they are made in a variety of different styles) which archeologists define as the hallmark of the Paleo Indian tradition in North America. Based on our present knowledge, this Paleo Indian period lasted from between 11,500 and 10,000 years ago .

Contemporary archeology, however, is attempting to move beyond chronological definition and sterile description of prehistoric culture into the dimension of understanding and explaining past lifeways. This pursuit of understanding moves us into a climate of uncertainty concerning the Paleo Indians. Archeologists have traditionally interpreted, based only on sites excavated in the Western United States, all Paleo Indian peoples as having been strictly hunters of now extinct Pleistocene megafauna such as the mastodon, mammoth, certain species of bison, etc. In other words, a model of Paleo Indian behavior inferred from excavations in the West has been constructed and applied to the interpretation of Paleo Indian sites in other regions, particularly in eastern North America. Evidence recently recovered and analyzed from the Shawnee Minisink site calls this practice into question.

The Shawnee Minisink site is located at the confluence of the Delaware River and Brodhead Creek some 3.5 km. northwest of the Delaware Water Gap. For those of you not familiar with the area, it lies in the Upper Delaware Valley of northeastern Pennsylvania which is flanked by the Kittatinny Mountains of the Appalachian Chain to the east and the Pocono Mountains, which form the escarpment of the Appalachian Plain, to the west. Excavations and surveys by the Upper Delaware Early Man Project recovered significant information about the Paleo Indians who once inhabited the valley. Most of these data were recovered from the Shawnee Minisink site where radiocarbon dates indicate occupation by these people around 10,600 years ago.

Excavation techniques at Shawnee Minisink were geared toward recovering every conceivable bit of information possible. Every artifact, and there were over 55,000, was mapped in relation to its exact horizontal and vertical position relative to an established site datum point. Even after this location process, all 8011 matrix was sifted to recover any artifacts which might have missed the excavator's eye. Samples of 9011 from each excavation unit were also processed, via a water separation technique, to recover small-scale floral and faunal remains. Over 4,000 soil tests were also completed to extract important information concerning past environmental conditions at the site locality. The American University computer in Washington, D.C. was called upon to store, organize, statistically analyze, and eventually, retrieve all the data in the form of maps, artifact lists, diagrams, etc. Over 5,000 color, infra-red, and black-and-white photographs as well as voluminous field notes and drawings also reinforce these computerized records. In all, it is safe to state that no archeological site has ever been excavated with any more precision or care. One could literally reconstruct the site back in the ground if necessary.

From our excavations and analysis it appears that a small band of people camped along the banks of the Delaware River and Brodhead Creek some 10,600 years ago. From the artifacts and chippage it seems that these people were making various stone tools (predominantly scrapers and flake tools) out of local black chert to be, in turn, employed in the manufacture of other tools. These secondary tools, now gone because of the biodegradable materials used in their manufacture, were possibly projectiles of bone, antler, or wood. While these people were at the site, they ate fish from the river or creek and also collected vegetal material such as hawthorn plums, hackberry, grape, blackberry, acalypha, and some chenopodium. Remains of all these faunal and floral resources were recovered during our excavations and are definitely associated with the Paleo Indian occupation. From the season when these vegetal resources would have become available, we can also infer that the period of occupation at the site was sometime during the late summer (perhaps late August or September).

Beyond these data, paleoenvironmental reconstruction of the entire upper Delaware Valley also tells us that a boreal forest consisting mainly of pine with intrusions of birch and oak along the water courses blanketed the region. Charcoal, analyzed from a hearth which once burnt at the Shawnee Minisink site, reflects this reconstruction in that it contained bits of white pine, willow, birch, and oak. Corresponding animal populations in the valley at this time included those species typical to the far North today, especially caribou. The megafauna which archeologists traditionally like to associate with Paleo

Indians were gone from the valley.

In terms of climate, we can also give you a weather report for the Upper Delaware Valley 10,600 years ago. Based on our computer models, which deduce the relationship between modern climate and vegetation and then mathematically transfer this relationship to fossil pollen assemblages representing the vegetation of the past, the following plectra emerges. The Paleo Indians at Shawnee Minisink experienced days in the late summer which averaged around 18 degrees centigrade (about 64 degrees Fahrenheit) with overcast skies prevalent. The direction of the south-to-north prevailing wind is predicted in our models and is also betrayed by the pattern of artifacts around a hearth which once warmed the visitors at Shawnee Minisink. A scarcity of artifacts on the hearth's northern boundary while thousands exist in all other directions, indicates wind was carrying smoke and heat to that portion of the site and making it unpleasant. Precipitation rates during this period were also much higher than today. Snowfall accumulated during the winter at a rate of 160 cm. per year versus 120 cm. today and rainfall was almost twice that of today. Most of these climatic anomalies can be directly linked to the Wisconsin glacial ice mass which had once extended into the valley itself and was at this time migrating northward but still disturbing normal weather patterns significantly.

Concluding, we must now assess the data from the Upper Delaware Valley in terms of archeology's preconceived theory of Paleo Indian lifeways. Shawnee Minisink represents one of a few select sites from this period with secure radio carbon dates and is the only Paleo Indian site in the region where information on subsistence practices has been recovered. At the very least, the research undertaken at this site informs us that all Paleo Indian groups were not solely engaged in the hunting of mastodons, mammoths, and other species of Pleistocene megafauna. On a more abstract level, these new data should also once again underline the inherent dangers in recognizing a pattern in the archeological record of one region in North America and then expecting it to be applicable continent-wide. It is true that for many years our knowledge of Paleo Indian peoples came from the only known sites of that period which were located in the western United States. However, 80 much significant new data, such as that from Shawnee Minisink, is today appearing from the eastern United States that one wonders if it is not a case of the western tail wagging the eastern dog.

Richard J. Dent is currently Research Archeologist with the National Colonial Farm of the Accokeek Foundation. His principal research interest focuses on the prehistory and history of eastern North America. Dent participated in the Upper Delaware Valley Early Man Project for three years and directed the excavation team at the Shawnee Minisink site in 1977.

PARK SERVICE BEGINS LIGHTHOUSE STUDY

Nora Pat Small

The blast of a fog horn piercing through dank, off-shore mist, or the nautical exploits of that legendary horse with the light around its neck that delivered up seamen into the hands of pirates along the North Carolina Coast, these images are enough to make any researcher's heart pump faster. A certain degree of romanticism has always infused historical research into those numerous and varied structures known as lighthouses. No matter how utilitarian their structure and whether they sit in the middle of a swamp or high and dry on the top of some craggy overlook, they continue to evoke images of pulse-stopping adventure, even among the most staid researchers. For this reason, the story of American lighthouses has most frequently been told from the historical or legendary viewpoint. Seldom has anyone attempted to classify lighthouses as a building type.

All too often a structure classified as a lighthouse receives no more exact grouping than just that -- lighthouse. It is categorized with structures that certainly function as lighthouses but have no more resemblance to each other than pepper to salt. Present research being undertaken by the National Park Service is attempting to separate and appropriately categorize the unique differences between structures in this large grouping of Park Service properties. With any study of a structural grouping, the researcher must examine each building in relationship to every other building of that same general type in order to place it in its proper perspective. Too frequently, this sort of work goes unformatted and is repeated for similar structures unnecessarily. The Park Service hopes that by creating a series of building type studies and by making these available to researchers, much of the repetitive legwork will be avoided.

Lighthouse types can be distinguished by the foundation construction and by their superstructures. The first is determined by the terrain, the second by necessity and tradition. Frequently foundations can consist of cut-stone, a metal caisson, screw-piles, or even the keeper's dwelling. The variety is extraordinary. A marshy environment might require screw-piles, as opposed to the stone foundations of the tall, shoreline structures. The superstructure can be an octagonal frame tower, a cylindrical masonry tower, a metal skeleton-frame tower, or any of a number of other combinations of materials and building styles.

Many of these variations in lighthouse types are linked to significant advances which permitted lighthouse engineers to construct on sites that had hitherto resisted all efforts to be lighted. New building techniques also permitted the construction of towers which could withstand gales and wave action for years. In studying lighthouses as a building type, one must understand the implications of building in stone rather than iron, for example, or sinking a caisson using a new technique, then building a superstructure on top of it.

Initial research indicates no neat chronological evolution in the construction of lighthouse types. In 1756 John Smeaton erected the most successful wave-swept lighthouse ever built, on Eddystone Rock off the English coast. Not until 1855 was his design employed at Minot's Ledge in the United States, and that was only after a skeleton frame structure of wrought-iron was swept clean from the rock in a storm. Various materials suit various lighthouse conditions best, so it is not surprising to find contemporaneous dwellings surmounted by towers of frame, masonry, and iron-plate.

The National Park Service owns a good cross-section of U.S. lighthouse types, ranging from some of the earliest and most traditional forms, such as the Sandy Hook lighthouse, to the much later and rather diminutive light at the end of Derby Wharf in Salem. There are free-standing metal skeleton-frame structures, plus iron-plate towers built atop fort bastions. Each of these various types will be studied and categorized according to age, building materials, and construction methods employed for the tower as well as for the foundation. The specific location of the structure will also be noted.

The categories will be designed so that the characteristics of any given lighthouse can be compared to those of any other lighthouse with ease. As such, this catalogue will serve as a tool for further studies on lighthouses. More importantly perhaps, it will also guide future Park Service acquisitions. Used as a planning tool, it can reveal what lighthouse types are not currently represented, and, thus, which purchases would contribute most to the Park Service properties.

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ELLIS ISLAND RESTORATION PROJECT

Professor August C. Bolino

Perhaps as many as 100 million Americans today are related to those late- 19th- and 20th-century pioneers who looked to America as a land of opportunity and freedom. Ellis Island was the gateway to that freedom.

The immigration station on Ellis Island in New York Harbor opened on New Year ' 8 Day, 1892, equipped to handle 10,000 immigrants a day. That first station was destroyed by fire- June 14, 1897, and all immigration records of the Port of New York for the years 1885-1890 were lost. Construction on the present station began immediately and was completed in December 1900, in time for the peak years of immigration, 1903-1914.

In the upset of World War I and the years following, Congress took action to stem the tide of the great Atlantic migration. Immigration was limited to 357,000 people per year and quotas were set for each country equal to three percent of the number from that country residing in the United States in 1910. In 1924, quotas were further restricted to two percent of national residents as recorded in the 1890 census. During the 1930's, Ellis Island became a refuge for immigrants from Nazi Germany, and after World War II, the Island served mainly as a port of debarkation for subversive aliens. In 1954, the Ellis Island station was closed to immigration, and one year later, it was declared "surplus property. " In the next decade the station fell into ruin. President Johnson designated it a national monument, but a Congressional plan which included a 130-foot hollow tower containing the names of all the immigrants, was abandoned soon after.

The Ellis Island Restoration Commission was originally established as a Bicentennial project for the State of New Jersey. Plans called for opening the Island to tourism beginning in 1976. Congress initially appropriated \$6 million for this purpose, then, in 1978, it authorized another \$24 million.

The plans for restoration of Ellis Island in keeping with its stature as a national monument, call for the development of a center for immigration studies, and the establishment of a museum. The museum would be located in the Great Hall, where immigrants were originally processed. In addition, multi-cultural (ethnic rooms in the old lounges on Islands 2 and 3 would contain maps, flags, books, pamphlets, articles, histories and microfilm of each cultural group. The research center would be housed in the old isolation wards. The Commission intends also to establish the Ellis Island Historical Foundation to make grants to scholars for immigration research.

The research efforts are concentrated in two areas: oral histories and documents, the oral history phase being **the** most critical, considering the age of the survivors. We have uncovered 36 projects to date that may have Ellis Island components.

In the document search, we have located the papers of certain Commissioners (for example, the Powderly, Corsi, Williams, and Caminetti papers). Beyond this, there are voluminous records of correspondence and other immigration materials in the National Archives, the Smithsonian Institution and the Library of Congress in Washington, D.C. Still other documents are scattered over the United States.

We are also accepting donations of books, pamphlets, brochures, passports, photographs, or other memorabilia about Ellis Island. These are being stored temporarily in the Ellis Island Room at the Catholic University of America until, restoration of the Island is completed. If you have an interest in this or any other phase of our work, please contact the Commission at Catholic University, Cardinal Station, Box 1314, Washington, D.C. 20064 or call 202/635s236. Your help will be appreciated.

Through an agreement with the U.S. Department of the Interior, the Ellis Island Restoration Commission has been designated as the chief private agent of public involvement in the restoration of the Island. When President Carter signed the new

authorization bill, the National Park Service created a "planning team" to draft a master plan for the Island.

As Vice President for Research for the full Committee, I am assisting the National Park Service in its planning activities I have proposed that we collect copies of all documents and materials that originated on the Island, including personal papers of the Commissioners-General of Immigration, the Commissioners of the Port of New York, the inspectors, the lawyers, the Surgeons-General and the staffs of the immigrant aid societies.

WANTED: DATA ON TERRA COTTA LAWN BORDER UNITS

An alignment of terra cotta border units was recently recorded in one of the units of Golden Gate NRA, San Francisco, which was the former estate of Adolph Sutro, one-time mayor and civic leader. Although most of the Victorian era structures and features of Mr. Sutro's estate are now gone, some lawn statuary, urns, and other items remain. We have recently located a 37 foot alignment of terra cotta units along a roadway edge which dates to about 1890. The units are about 12 inches long and 5 3/4 inches high, with five decorative balls along a top edge. In cross-section, they appear much like a railroad rail. A short hole at either end may have been for a fastener or for the escape of gases and heat during firing. They are slightly glazed or vitrified and are dark brown or black without other colors. Although we assume local manufacture, we would like comparative information on other lawn or road border units of terra cotta. Please contact: Roger E. Kelly, Regional Archeologist, Western Region, 450 Golden Gate Avenue, San Francisco, CA 94102 (FTS 556-6983 or 556-9343) or James Delgado, Cooperative Student (History), Golden Gate NRA, Bldg. 201 Fort Mason, San Francisco, CA 94123 (FTS 556-9504).